

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of

Martin WYETH

Conf.

Application No. NEW NON-PROVISIONAL

Group

Filed March 15, 2004

Examiner

BALL DETECTION APPARATUS

CLAIM TO PRIORITY

Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 15, 2004

Sir:

Applicant(s) herewith claim(s) the benefit of the priority filing date of the following application(s) for the above-entitled U.S. application under the provisions of 35 U.S.C. § 119 and 37 C.F.R. § 1.55:

| <u>Country</u> | <u>Application No.</u> | <u>Filed</u> |
|----------------|------------------------|----------------|
| GREAT BRITAIN | 0307159.4 | March 28, 2003 |

Certified copy(ies) of the above-noted application(s) is(are) attached hereto.

Respectfully submitted,

YOUNG & THOMPSON



Benoit Castel, Reg. No. 35,041
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
703) 979-4709

BC/ia

Attachment(s): 1 Certified Copy(ies)

W. H. Bond



INVESTOR IN PEOPLE

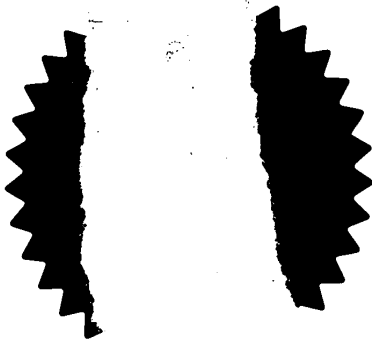
The Patent Office
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Cardiff Road
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South Wales
NP10 8QQ

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2 March 2004



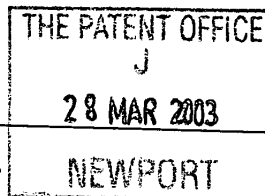
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P01/7700 0.00-0307159.4

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The Patent Office

Cardiff Road
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NP10 8QQ



1. Your reference

MRH.PO4761GB

2. Patent application number

(The Patent Office will fill in this part)

0307159.4

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Martin Wyeth
Unit 5 Woodside
South Marston Park
Swindon, SN3 4WA

Patents ADP number (if you know it)

8598682001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

BALL DETECTION APPARATUS

5. Name of your agent (if you have one)

Marks & Clerk

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

27 Imperial Square
Cheltenham
GL50 1RQ

Patents ADP number (if you know it)

18014

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

No

a) any applicant named in part 3 is not an inventor, or

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See note (d))

Patents Form 1/77

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| | |
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| Description | 5 |
| Claim(s) | 2 |
| Abstract | 1 |
| Drawing(s) | 1 |

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77) 1

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Mr M R Higgins

Date

Marks & Clerk

27th March 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr M R Higgins
01242 524520

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BALL DETECTION APPARATUS

This invention relates to ball detection apparatus for detecting when a golf ball is hit off a golf tee of an automatic golf ball teeing machine.

5 Automatic golf ball teeing machines are known and are in use at some golf driving ranges. They comprise a device for feeding balls onto a tee and means for detecting when a ball leaves the tee. The feeding device operates in response to the detecting means. The detecting means of these known teeing devices includes an air pump for pumping air through the tee and the detecting means relies on sensing a
10 change in pressure when the ball leaves the tee.

Golf balls do not create a significant back pressure due to the surface pattern they possess and dirty balls can create even less back pressure. Therefore, a change in pressure is difficult to detect. Also, the present detectors are expensive to make
15 as they require an air pump, a pressure sensor and a decoder and fail to detect the difference between a ball being hit from a tee and a ball falling off a tee.

It is also known to use arrangements which rely on weight detection to detect when a ball leaves the tee. However, these arrangements often malfunction as a
20 result of mud or the like.

The present invention seeks to provide improved ball detection apparatus for

an automatic golf ball teeing machine.

According to a first aspect of the invention there is provided ball detection apparatus for detecting when a golf ball is hit off a golf tee of an automatic golf ball teeing machine, comprising a radar device for producing a first signal in response to
5 detecting movement of a golf club towards the tee, a directional microphone for producing a second signal in response to detecting the sound of a golf club striking a golf ball and monitoring means for detecting a coincidence between the first and second signals.

10

Preferred and/or optional features of the first aspect of the invention are set forth in claims 2 to 5.

According to a second aspect of the present invention, there is provided an
15 automatic golf ball teeing machine comprising ball detection apparatus according to the first aspect of the invention and a ball feeder for feeding balls one at a time to a golf tee, the ball feeder being operable in response to the monitoring means of the detection apparatus detecting a coincidence between the first and second signals.

20

Preferred and/or optional features of the second aspect of the invention are set forth in claims 8 to 10.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of one embodiment of ball detection
5 apparatus according to a first aspect of the invention incorporated in an automatic golf ball teeing machine, and

Figure 2 is a graph showing a coincidence between two signals produced by the ball detection apparatus shown in Figure 1.

10

Referring to Figure 1 of the drawings, the automatic golf ball teeing machine shown therein comprises a ball feeder 10 for feeding balls one at a time to a golf tee. The ball feeder 10 includes a tee 11 and a mechanism (not shown) for delivering balls fed in through a ball inlet 12 of the feeder 10 one at a time to the tee. The ball feeder
15 10 as such is not the subject of this application but one example of such a ball feeder is disclosed patent application no. of even date.

The automatic golf ball teeing machine also comprises ball detection apparatus for detecting when a golf ball is hit off the tee 11. The ball detection apparatus
20 comprises a radar gun 13 housed in a hinged lid 14 of the ball inlet 12 and a directional microphone 15 supported by a control panel 16 located alongside the ball feeder 10. The radar gun 13 is aimed towards the path a golf club will take in hitting

a ball from the tee 11 and is mounted on a transducer board (not shown).

The directional microphone 15 is aimed at the tee 11.

5 The ball detection apparatus also comprises monitoring means for detecting a coincidence between a first signal produced by the radar gun 13 and a second signal produced by the directional microphone 15 and, when certain criteria are met, for producing an output signal which is fed to the aforesaid mechanism of the ball feeder 10 so that a fresh golf ball is delivered to the tee 11.

10

Processing circuitry of the monitoring means is contained within the control panel 16. The microphone 15 is preferably responsive to sound within a frequency range of 2 to 5 KHz. This will filter out some background noise. The processing circuitry is arranged to product an output signal only if it detects a signal from the directional microphone 15 whilst a signal from the radar gun 13 is at or close to its peak level. This will be at a time when the golf club is travelling at maximum or near maximum speed. The processing circuitry is also arranged to only produce an output signal if it detects a coincidence between the signal from the radar gun 13 and a signal from the directional microphone 15 which is above a predetermined level.

15 That level is varied in accordance with the amplitude of the signal from the radar gun 13 so that as the radar gun 13 detects a higher swing speed, the processing circuitry requires a higher intensity signal from the directional microphone 15 to produce an

20

output signal. The logic behind this is that as a golf ball is hit harder the intensity of the sound of impact increases.

The control panel could also include a display 17 for displaying the maximum swing speed each time a ball is hit from the tee 11.

Figure 2 is a graph showing a coincidence between a first signal A produced by the radar gun 13 and a second signal B produced by the directional microphone 15. The signal B falls within a window W of signal A indicative that the golf club is at or close to maximum swing speed and has a level greater than predetermined level L determined by the processing circuitry in accordance with the intensity of signal A. In these circumstances, the processing circuitry will output a signal to the ball feeder 10 which will operate in response to this output signal and will feed a new ball to the tee 11.

15

The embodiment described above is given by way of example only and various modifications may be apparent to persons skilled in the art without departing from the scope of the invention as defined by the appended claims.

CLAIMS

1. Ball detection apparatus for detecting when a golf ball is hit off a golf tee of
an automatic golf ball teeing machine, comprising a radar device for producing a
5 first signal in response to detecting movement of a golf club towards the tee, a
directional microphone for producing a second signal in response to detecting the
sound of a golf club striking a golf ball and monitoring means for detecting a
coincidence between the first and second signals.
- 10 2. Ball detection apparatus as claimed in claim 1, wherein the microphone is
responsive to sound within a frequency range of 2 to 5 KHz.
3. Ball detection apparatus as claimed in claim 1 or claim 2, wherein the
monitoring means is arranged to produce an output signal only if it detects a second
15 signal while the first signal is at or close to its peak level.
4. Ball detection apparatus as claimed in any one of the preceding claims,
wherein the monitoring means is arranged to produce an output signal only if it
detects a coincidence between the first and second signals and the second signal is
20 above a predetermined level.
5. Ball detection apparatus as claimed in claim 4, wherein the monitoring varies

said predetermined level in accordance with the amplitude of the first signal.

6. Ball detection apparatus substantially as hereinbefore described with reference to the accompanying drawing.

5

7. An automatic golf ball teeing machine comprising ball detection apparatus as claimed in any one of claims 1 to 6 and a ball feeder for feeding balls one at a time to a golf tee, the ball feeder being operable in response to the monitoring means of the detection apparatus detecting a coincidence between the first and second signals.

10

8. An automatic teeing machine as claimed in claim 7, wherein the radar device is supported by the ball feeder.

9. An automatic teeing machine as claimed in claim 7 or claim 8, wherein the microphone is supported by a control panel housing processing circuitry of the monitoring means.

15

10. An automatic teeing machine as claimed in claim 9, wherein the control panel has a display for displaying the maximum speed of the golf club.

ABSTRACTBALL DETECTION APPARATUS

- The ball detection apparatus is for detecting when a golf ball is hit off a golf
- 5 tee of an automatic golf ball teeing machine. The detection apparatus comprises a radar device 13 for producing a first signal in response to detecting movement of a golf club towards the tee 11, a directional microphone 15 for producing a second signal in response to detecting the sound of a golf club striking a golf ball and monitoring means for detecting a coincidence between the first and second signals.
- 10 An automatic golf ball teeing machine including such ball detection apparatus is also disclosed.

(Refer to Figure 1)

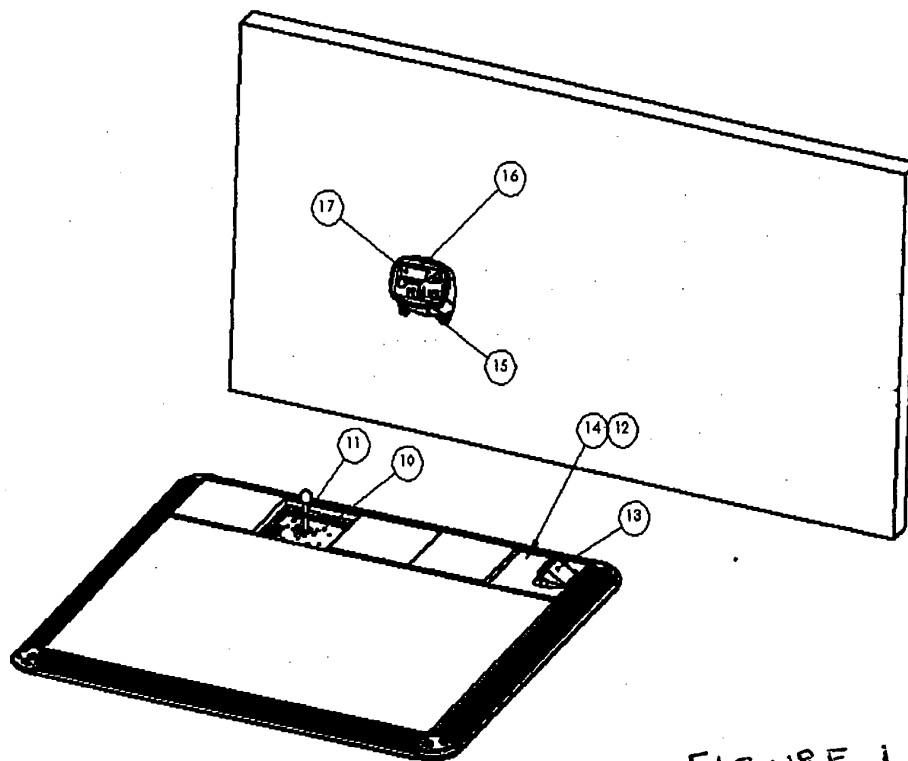


FIGURE 1

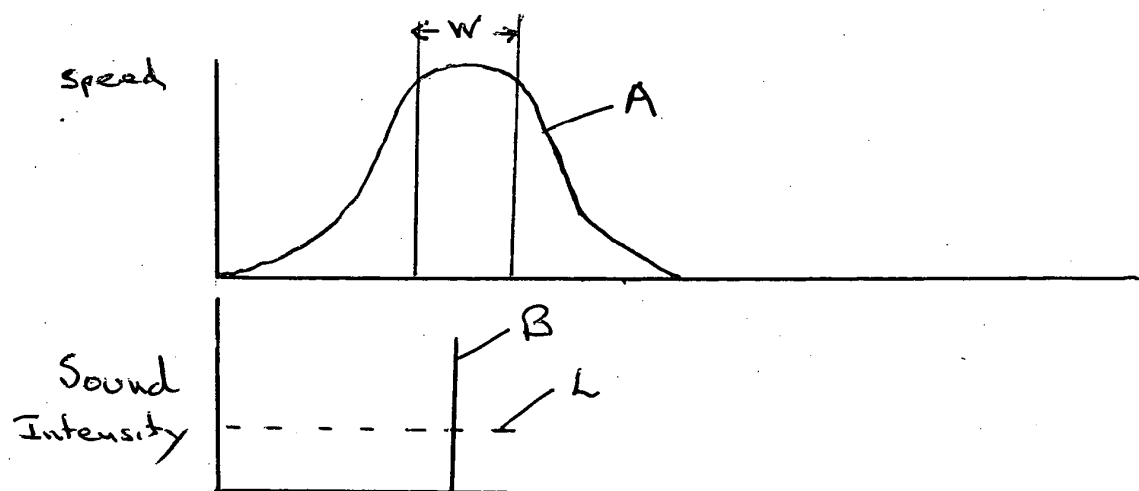


FIGURE 2

DOCUMENT FILED BY:
YOUNG & THOMPSON
745 SOUTH 23RD STREET
ARLINGTON, VIRGINIA 22202
Telephone 703/521-2297